

Appl. No. 09/607,815
Amdt. Dated February 1, 2006
Reply to Office Action of November 1, 2005

Listing of the Claims:

1. (Currently Amended) A method of operating a processor to repeatedly execute an instruction, comprising:
 - determining at run time how many times a single instruction is to be repeated;
 - loading at run time an existing general purpose register with a count value indicative of the number of times a single instruction is to be executed;
 - fetching and executing a REPEAT instruction, the REPEAT instruction indicating the single instruction to be repeatedly re-executed;
 - fetching the single instruction; and
 - repeatedly executing the single instruction for a consecutive number of times as indicated by the count value without refetching the single instruction and without adding a NOP (no operation) instruction;
 - adjusting the count value in the register each time the single instruction is executed.
2. (Currently Amended) A method of operating a processor to repeatedly execute an instruction comprising:
 - fetching a REPEAT instruction;
 - executing a REPEAT instruction, wherein execution of the REPEAT instruction determines and stores at run time in [[a]] an existing general purpose register a count value indicative of the number of times a single instruction is to be executed;
 - fetching the single instruction; and
 - repeatedly executing the single instruction consecutively for as many times as indicated by the count value without re-fetching the single instruction and without fetching any other instruction and without adding a NOP (no operation) instruction[[s]];
 - decrementing the count value in the register each time the single instruction is executed; and
 - incrementing a program counter once the count value in the register is one of

Appl. No. 09/607,815
Amdt. Dated February 1, 2006
Reply to Office Action of November 1, 2005

less than zero and equal to zero, thereby providing an effective data rate of one transfer every clock cycle;

wherein decrementing the count value in the register does not start until repeatedly executing the single instruction begins.

3. (Currently Amended) A method of operating a processor to repeatedly execute an instruction comprising:

determining at run time a count value indicative of how many times a single instruction is to be repeated;

loading at run time a general purpose register with the count value indicative of the number of times a single instruction is to be executed;

fetching and executing a REPEAT instruction indicating the single instruction that is to be repeatedly executed;

incrementing a program counter;

fetching the single instruction;

repeatedly executing the single instruction for as many times as indicated by the count value stored in the register without refetching the single instruction and without fetching any other instruction and without adding a NOP (no operation) instruction;

decrementing the count value stored in the register each time the single instruction is executed; and

stalling the program counter until the count value in the register is one of less than zero and equal to zero, thereby providing an effective data rate of one transfer every clock cycle;

wherein decrementing the count value in the register does not start until repeatedly executing the single instruction begins.

4. (Original) A method of operating a processor according to claim 3, wherein said count value is stored in said count register before execution of said REPEAT

Appl. No. 09/607,815
Amdt. Dated February 1, 2006
Reply to Office Action of November 1, 2005

instruction.

Claims 5-6. (Cancelled)

7. (Currently Amended) A method according to claim 3, wherein method further comprises:

~~decrementing said count value stored in said register each time said single instruction is executed; and~~

determining whether said count value is less than or equal to zero.

8. (Currently Amended) A processor for repeatedly executing a single instruction, said processor comprising:

means for determining at run time a count value indicative of how many times a single instruction is to be ~~repeated~~repeated;

means for loading at run time a general purpose register with ~~[[a]]~~the count value indicative of the number of times the single instruction is to be executed;

means for fetching a REPEAT instruction, the REPEAT instruction indicating the single instruction to be repeatedly executed;

means for executing the REPEAT instruction indicating the single instruction to be repeatedly executed;

means for fetching the single instruction; ~~[[and]]~~

means for repeatedly executing the single instruction a consecutive number of times as indicated by the count value without refetching the single instruction and without adding a NOP (no operation) instruction; and

means for adjusting the count value in the register each time the single instruction is executed

wherein the means for adjusting the count value only operates when the means for repeatedly executing the single instruction is executing the single instruction.

-Page 4 of 12-

Appl. No. 09/607,815
Amdt. Dated February 1, 2006
Reply to Office Action of November 1, 2005

9. (Currently Amended) A processor for repeatedly executing an instruction, comprising:

- means for determining at run time how many times a single instruction is to be repeated;
- means for fetching a REPEAT instruction;
- means for executing a REPEAT instruction, wherein execution of the REPEAT instruction at run time stores in a general purpose register a count value indicative of the number of times a single instruction is to be executed;
- means for fetching the single instruction;
- means for repeatedly executing the single instruction for as many times as indicated by the count value without re-fetching the single instruction and without fetching any other instruction and without adding a NOP (no operation) instruction;
- means for decrementing the count value in the register each time the single instruction is executed; and
- means for incrementing a program counter once the count value in the register is less than zero, thereby providing an effective data rate of one transfer every clock cycle;

wherein the means for decrementing only operates while the means for repeatedly executing the single instruction is executing the single instruction.

10. (Currently Amended) A processor for repeatedly executing an instruction, comprising:

- means for determining at run time how many times a single instruction is to be repeated;
- means for loading a general purpose register at run time with a count value indicative of the number of times a single instruction is to be executed;
- means for fetching a REPEAT instruction indicating the single instruction that is to be repeatedly executed;

Appl. No. 09/607,815
Amdt. Dated February 1, 2006
Reply to Office Action of November 1, 2005

means for executing the REPEAT instruction indicating the single instruction that is to be repeatedly executed without adding a NOP (no operation) instruction;

means for incrementing a program counter;

means for fetching the single instruction; and

means for repeatedly executing the single instruction for a consecutive number of times as indicated by a count value stored in a count register without refetching the single instruction and without fetching any other instruction;

means for decrementing the count value stored in the register each time the single instruction is executed; and

means for means for incrementing a program counter once the count value in the register is equal to zero, thereby providing an effective data rate of one transfer every clock cycle

wherein the means for decrementing only operates while the means for repeatedly executing the single instruction is executing the single instruction.

11. (Original) A processor according to claim 10, wherein said count value is stored in said count register before execution of said REPEAT instruction.

Claims 12 – 13 (Cancelled)

14. (Currently Amended) A processor according to claim 10, wherein the processor further comprises:

~~means for decrementing said count value stored in said register each time the single instruction is executed; and~~

means for determining whether said count value is less than or equal to zero.

15. (Currently Amended) A processor for repeatedly executing one or more processor instructions, said processor comprising:

-Page 6 of 12-

Appl. No. 09/607,815
Amdt. Dated February 1, 2006
Reply to Office Action of November 1, 2005

a memory address register associated with a main memory;
a memory data register associated with the main memory;
a memory control for generating memory control signals;
a program counter for storing a memory address location of the main memory
where an instruction is to be fetched;
an instruction register for storing an instruction that is to be executed;
at least one general purpose register for storing a count;
decode and execute control logic for decoding and executing an instruction
stored in the instruction register; and
a state machine for controlling the fetching and repeated execution of a single
instruction, the state machine configured to repeatedly execute the single instruction by
signaling the instruction register to hold the same instruction and not fetch the next
instruction and to decrement the count stored in the general purpose register each time the
single instruction is executed, and to signal the program counter not to increment until the
count stored in the general purpose register is below a threshold value, thereby providing an
effective data rate of one transfer every clock cycle;
wherein the state machine only decrements the count stored in the general
purpose register while the single instruction is executed.

16. (Cancelled)

17. (Original) A processor according to claim 15, wherein said general
purpose register includes a first register for storing a count value indicative of the number of
times the single instruction is to be repeatedly executed.

Claims 18-22 (Cancelled)

Appl. No. 09/607,815
Amdt. Dated February 1, 2006
Reply to Office Action of November 1, 2005

23. (Currently Amended) The processor of claim 15, wherein the state[[me]] machine is configured to increment the program counter once the count value is equal to zero.

24. (Previously Presented) The processor of claim 15, further comprising the state machine configured to increment the program counter once the count value is less than zero.

25. (Cancelled)

26. (Previously Presented) The processor for repeatedly executing a single instruction of claim 8, further comprising means for incrementing a program counter once the count value is equal to zero.

27. (Previously Presented) The processor for repeatedly executing a single instruction of claim 8, further comprising means for incrementing a program counter once the count value is less than zero.

28. (Previously Presented) The processor for repeatedly executing a single instruction of claim 8, wherein a program counter remains unchanged as the single instruction is repeatedly executed.

29. (Previously Presented) The method of operating a processor to repeatedly execute an instruction of claim 2, wherein the program counter remains unchanged as the single instruction is repeatedly executed.

Appl. No. 09/607,815
Amdt. Dated February 1, 2006
Reply to Office Action of November 1, 2005

30. (Previously Presented) The method of operating a processor to repeatedly execute an instruction of claim 2, wherein the program counter is effectively stalled on the single instruction.

31. (Previously Presented) The method of operating a processor to repeatedly execute an instruction of claim 3, wherein the program counter remains unchanged as the single instruction is repeatedly executed.

32. (Previously Presented) The method of operating a processor to repeatedly execute an instruction of claim 3, wherein the program counter is effectively stalled on the single instruction until the single instruction executes the number of times indicated by the count value.

33. (New) The method of claim 1, wherein the method is operating in a pre-emptive multi-tasking environment, further comprising:

suspending the repeatedly executing the single instruction step while a second context executes; and

resuming the repeatedly executing the single instruction after the second context executes;

wherein contents of an instruction buffer containing the single instruction are locked and preserved while the second context executes.